We claim:

1. A composition comprising a hydrozirconated matrix having at least one catalytic component and at least one olefin-based material, the hydrozirconated matrix formed by reaction of a zirconium composition and the olefin-based material.

2. The composition of claim 1, wherein the olefin-based material is an organic material having a plurality of olefin groups.

3. The composition of claim 2, wherein the olefin groups are selected from the group consisting of vinyl, allyl, alkenyl, alkynyl, conjugated olefin groups, olefin groups having polar substituents and combinations thereof.

4. The composition of claim 1, wherein the olefin-based material is selected from the group consisting of divinylbenzene polymers, divinylbenzene copolymers, styrene/divinylbenzene copolymers, divinylbenzene resins, cross-linked divinylbenzene polymers, cross-linked butadiene polymers, styrene/butadiene copolymers, styrene/isoprene copolymers, vinylsiloxane polymers and combinations thereof.

5. The composition of claim 4, wherein the olefin-based materials are formed in the presence of porogens.

6. The composition of claim 2, wherein a plurality of olefin groups are disposed on surfaces of the organic material.

7. The composition of claim 2, wherein the olefin-based material is a macroporous polymeric material prepared in the presence of a porogen.

8. The composition of claim 7, wherein the macroporous polymeric material is prepared from divinylbenzene.

9. The composition of claim 1, wherein the olefin-based material is an inorganic material having a plurality of olefin groups.

10. The composition of claim 9, wherein the olefin groups are selected from the group consisting of vinyl, allyl, alkenyl, alkynyl, conjugated olefin groups, olefin groups having polar substituents and combinations thereof.

11. The composition of claim 9, wherein the inorganic solid is selected from the group consisting of silica polymorphs, alumina polymorphs, magnesia polymorphs, siloxanes, alumoxanes, alkylalumoxanes, alkylsiloxanes, aluminosilicates, clays, zeolites and combinations thereof.

12. The composition of claim 9, wherein a plurality of olefin groups are disposed on surfaces of the inorganic material.

13. The composition of claim 1, wherein the olefin-based material is a vinylsiloxane.

14. The composition of claim 1, wherein the zirconium composition is an organozirconium compound capable of undergoing a hydrozirconation reaction.

15. The composition of claim 14, wherein the organozirconium compound is selected from the group consisting of bis (cyclopentadienyl)zirconium dihydride, bis (pentamethylcyclo-pentadienyl) zirconium dihydride, bis (methylcyclopentadienyl) zirconium dihydride, bis (n-butylcyclopentadienyl) zirconium dihydride, bis (indenyl) zirconium

dihydride, bis (1-fluorenyl) zirconium dihydride, bis (cyclopentadienyl) zirconium hydrido chloride, bis (pentamethylcyclopentadienyl) zirconium hydrido chloride, bis (methylcyclopentadienyl) zirconium hydrido chloride, bis (n-butylcyclopentadienyl) zirconium hydrido chloride, bis (indenyl) zirconium hydrido chloride, bis (fluorenyl) zirconium dihydrido chloride, bis (cyclopentadienyl)zirconium methyl hydride, bis (pentamethylcyclopentadienyl) zirconium methyl hydride, bis (methylcyclopentadienyl) zirconium methyl hydride, bis (n-butylcyclopentadienyl) zirconium methyl hydride, bis (pentamethylcyclo-pentadienyl)zirconium (phenyl)(hydride), bis (pentamethylcyclopentadienyl) zirconium (methyl)(hydride), bis (indenyl) zirconium methyl hydride, bis (1-fluorenyl) zirconium methyl hydride, methylene bis(cyclopentadienyl) zirconium methyl hydride, methylene bis(cyclopentadienyl) zirconium hydrido chloride, methylene bis(cyclopentadienyl) zirconium dihydride, ethylene bis(cyclopentadienyl) zirconium methyl hydride, ethylene bis(cyclopentadienyl) zirconium hydrido chloride, dimethylsilyl bis(cyclopentadienyl) zirconium methyl hydride, ethylene bis(cyclopentadienyl) zirconium dihydride, dimethylsilyl bis(cyclopentadienyl) zirconium dihydride, methylene(cyclopentadienyl) (1-fluorenyl) zirconium methyl hydride, dimethysilyl(cyclopentadienyl) (1-fluorenyl) zirconium dihydride, isopropyl(cyclopentadienyl)(1-fluorenyl) zirconium methyl hydride, isopropyl(cyclopentadienyl) (1- octahydrofluorenyl) zirconium methyl hydride, dimethylsilyl(methylcyclopentadienyl) (1-fluorenyl) zirconium dihydride, methylene(cyclopentadienyl) (tetramethylcyclopentadienyl) zirconium methyl hydride, methylene(cyclopentadienyl) (tetramethylcyclopentadienyl) zirconium dihydride, ethylenebis(indenyl)zirconium dihydride, ethylenebis(indenyl)zirconium hydrido chloride, ethylenebis(indenyl)zirconium methyl hydride, dimethylsilylbis(indenyl)zirconium methyl hydride,

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dimethylsilylbis(indenyl)zirconium dihydride, dimethylsilylbis(indenyl)zirconium hydrido chloride, ethylenebis(tetrahydroindenyl)zirconium dihydride, ethylenebis(tetrahydroindenyl)zirconium methyl hydride, ethylenebis(tetrahydroindenyl)zirconium hydrido chloride, dimethylsilylbis(3-trimethylsilylcyclopentadientyl)zirconium dihydride, dimethylsilylbis(3-trimethylsilylcyclopentadientyl)zirconium methyl hydride, chemically and structurally related zirconium compound and combinations thereof.

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16. The composition of claim 1, wherein the catalytic component is an organometallic catalyst selected from the group consisting of metals of Group 3-10, non-metals, lanthanide metals, actinide metals and combinations thereof.

17. The composition of claim 1, wherein the catalytic component is a Ziegler-Natta catalyst.

18. The composition of claim 1, wherein at least one catalytic component is a metallocene catalyst selected from the group of metals of Group 3-10, non-metals, lanthanide metals, actinide metals and combinations thereof.

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19. The composition of claim 1, wherein the hydrozirconated matrix further comprising a plurality of catalytic components.

20. The composition of claim 1, wherein the hydrozirconated matrix further comprises combinations of Ziegler-Natta and single-site catalysts.

21. The composition of claim 1, further comprising at least one activator component.

22. The composition of claim 1, used for polymerizing at least one olefin monomer.

23. The composition of claim 22, wherein the olefin monomer is selected from the group consisting of unbranched aliphatic olefins having from 2 to 12 carbon atoms, branched aliphatic olefins having from 4 to 12 carbon atoms, unbranched and branched aliphatic α-olefins having from 2 to 12 carbon atoms, conjugated olefins having 4 to 12 carbon atoms, aromatic olefins having from 8 to 20 carbons, unbranched and branched cycloolefins having 3 to 12 carbon atoms, unbranched and branched acetylenes having 2 to 12 carbon atoms, and combinations thereof.

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24. The composition of claim 22, wherein the olefin monomer is a polar olefin monomer having from 2 to 12 carbon atoms and at least one atom selected from the group consisting of O, N, B, Al, S, P, Si, F, Cl, Br and combinations thereof.

25. The composition of claim 22, wherein the hydrozirconated matrix is represented by a formula $[Cp^1Cp^2MR]^+ [NCA]^-$, wherein M is zirconium, Cp^1 is a substituted or non-substituted cyclopentadienyl ring and Cp^2 is the same or different, substituted or non-substituted cyclopentadienyl ring and may be bridged symmetrically or asymmetrically to Cp^1, R is a hydrocarbyl group derived from the hydrozirconation of an olefin based material and NCA is a non-coordinating anion.

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26. The composition of claim 1, wherein the hydrozirconated matrix is prepared from olefin-based materials having particle diameters ranging from 5 nm to 1000 μm.

27. An olefin polymerization process that comprises contacting at least one olefin monomer and at least one hydrozirconated matrix having at least one catalytic component, polymerizing the olefin monomer to produce a polyolefin.

28. The process according to claim 27, wherein the olefin monomer is selected from the group consisting of unbranched aliphatic olefins having from 2 to 12 carbon atoms, branched aliphatic olefins having from 4 to 12 carbon atoms, unbranched and branched aliphatic α-olefins having from 2 to 12 carbon atoms, conjugated olefins having 4 to 12 carbon atoms, aromatic olefins having from 8 to 20 carbons, unbranched and branched cycloolefins having 3 to 12 carbon atoms, unbranched and branched acetylenes having 2 to 12 carbon atoms, and combinations thereof.

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29. The process according to claim 27, wherein the olefin monomer is a polar olefin monomer having from 2 to 12 carbon atoms and at least one atom selected from the group consisting of O, N, B, Al, S, P, Si, F, Cl, Br and combinations thereof.

30. The process according to claim 27, wherein the olefin monomer is selected from the group consisting of ethylene, propene, 1-butene, 1-hexene, butadiene, styrene, alpha-methylstyrene, cyclopentene, cyclohexene, cyclohexadiene, norbornene, norbornadiene, cyclooctadiene, divinylbenzene, trivinylbenzene, acetylene, diacetylene, alkynylbenzene, dialkynylbenzene, ethylene/1-butene, ethylene/isoprene, ethylene/1-hexene, ethylene/1-octene, ethylene/cyclopentene, ethylene/cyclohexene, ethylene/butadiene,

ethylene/hexadiene, ethylene/styrene, ethylene/acetylene, propene/1-butene, propene/styrene, propene/butadiene, propene/1,6-hexadiene, propene/acetylene, ethylene/propene/1-butene, ethylene/propene/1-hexene, ethylene/propene/1-octene, and combinations thereof.

31. The process according to claim 27, wherein at least one polyolefin formed from the polymerization is selected from the group consisting of polyethylene, polypropylene, and polystyrene.

32. The process according to claim 27, wherein the polymerization is a copolymerization of ethylene and higher α-olefins.

33. The process according to claim 27, wherein the polymerization is a copolymerization of propene and higher α-olefins.

34. The process according to claim 27, wherein the polymerization is a copolymerization of styrene and higher α-olefins.

35. The process according to claim 27, further comprising stereospecific polyolefins.

36. The process according to claim 27, further comprising stereoregular polyolefins.

37. The process according to claim 27, further comprising polyolefins having stereospecific structures selected from the group consisting of atactic, isotactic, syndiotactic, hemi-isotactic and stereoregular block combinations thereof.

38. The process according to claim 27, further comprising polyolefins incorporating a plurality of olefin monomers.

39. The process according to claim 27, wherein the polyolefin is selected from the the group consisting of HDPE, LDPE, LLDPE and combinations thereof.

40. The process according to claim 27, wherein the polyolefin is a copolymer of ethylene and α-olefins selected from the group consisting of 1-butene, 1-hexene and 1-octene.

41. The process according to claim 27, wherein a polyolefin particle essentially retains shape of a prepared matrix particle.

42. The process according to claim 27, wherein the catalytic component is a Ziegler-Natta catalyst.

43. The process according to claim 27, wherein the catalytic component is a single-site catalyst system.

44. The process according to claim 27, wherein the polyolefin is prepared in a reactor system selected from the group consisting of gas phase reactors, slurry phase reactors and solution phase reactors and combinations thereof.

45. A coating process comprising depositing the hydrozirconated matrix of claim 1 on a substrate and polymerizing olefin monomer to produce a polyolefin coated surface, object or particulate.

46. The process according to claim 45, wherein the substrate is selected from the group consisting of clays, micas, silicates, metals, non-metal oxides, organometallic oxides and inorganic oxides.

47. A process for preparing a composite of substrate and polyolefin in-situ using the hydrozirconated matrix of claim 1 in combination with at least one substrate.

48. A process according to claim 47, wherein the substrate is selected from the group consisting of clays, micas, silicates, metals, non-metal oxides, organometallic oxides and inorganic oxides.

49. A process according to claim 47, wherein polyolefin properties are modified.

50. A process according to claim 49, wherein the property modified is fire retardancy.

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51. A process for the production of hydrophobically modified particles in the form of spheres, surfaces and objects in which a catalytic hydrozirconated matrix is disposed on the surfaces thereof.